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EXAMINER				
STIMPERT, PHILIPPEARL				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/564,584

Applicant(s)

BIESTER, KLAUS

Examiner

Philip Stimpert

Art Unit

3746

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 October 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6, 8-13, 15, 16, 33, 35-39 and 42-46 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6, 8-13, 15, 16, 33, 35-39 and 42-46 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 January 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-848)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 1/22/2007
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the double helical gear of claim 9, and the surface power source of claim 44 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because the reference character "69" has been used to designate both a ring element

(paragraph 55) and a code carrier (paragraph 57). Further, in paragraph 55, the toothed sleeve is given the reference characters "14" and "15". The examiner notes that the specification has not been checked to the extent that all such errors have certainly been identified, and therefore a detailed review of the drawings and specification to identify and correct further errors is in order.

3. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1-6, 8-16, 33, 35-39, and 42-46 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

6. Regarding claim 1, the phrase "such as" renders the claim indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention. See MPEP § 2173.05(d). Similarly, the language "in particular" in line 1 is also indefinite, as it is unclear if the limitations which follow actually limit the scope of the claim.
7. Regarding claim 3, the limitation of "the spindle drive" lacks antecedent basis in the claim.
8. Regarding claim 4, the limitation of "the threaded spindle" lacks antecedent basis in the claim.
9. Regarding claim 5, the limitations of "the spindle nut" and "the reduction gear" lack antecedent basis in the claim.
10. Regarding claim 6, the limitation of "the harmonic drive gear" lacks antecedent basis in the claim.
11. Regarding claim 8, the limitation of "the harmonic drive gear" lacks antecedent basis in the claim. Further, it is not clear if the "helically toothed spur gear" of claim 8 is a clarification of the "spur gear" of claim 2, or if it instead constitutes a separate element.
12. Regarding claim 9, the antecedent basis of the limitation "the spur gear" is unclear, as claim 2 recites "a spur gear" and claim 8 recites "a helically toothed spur gear."

13. Regarding claim 11, the claim recites that "each hole is assigned a non-return valve." "Assigned" does not clearly convey the relationship between the holes and the valves, and the use of that language renders the claim indefinite.

14. Regarding claim 12, the limitation of "the holes" lacks antecedent basis in the claim. The examiner believes that this claim is intended to depend from claim 10 rather than claim 1, and claim 12 will be so interpreted for the rest of this office action.

15. Regarding claim 35, the limitation of "the pump housing" lacks antecedent basis in the claim.

16. Regarding claim 16, the limitation of "the intermediate reservoir" lacks antecedent basis in the claim.

17. Regarding claim 38, the claim recites that "a position sensor is assigned to at least the threaded spindle." "Assigned" does not clearly convey the relationship between the position sensor and the spindle, and the use of that language renders the claim indefinite.

18. Regarding claim 43, line 5 recites "an electrical drive device movably connected to the piston of the piston." It is unclear what structure is being described by this recitation, as only a piston has been recited previously in the claim, rather than a piston of the piston. The examiner will disregard "of the piston" for the purposes of this office action.

19. Regarding claim 44, the limitation of "the power" lacks antecedent basis in the claim. This will be interpreted as "the power source" for the purposes of this office action.

Claim Rejections - 35 USC § 102

20. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

21. Claims 44-46 are rejected under 35 U.S.C. 102(b) as anticipated by Dietz et al. (US 2002/0108747).

22. Regarding claim 44, Dietz et al. teach a pump apparatus for a subsea tree used in the production of hydrocarbons, comprising a power source (30) at a surface of the sea, a pump (102) to pump hydraulic fluid into a conduit (77) for hydraulic actuation, an electrical drive device (see paragraph 25) movably connected to the pump (102) to drive the pump, and an electrical cable (80) connecting the power source to the electrical drive device.

23. Regarding claim 45, Dietz et al. teach a hydraulic source (see Fig. 24) located subsea and communicating with the pump for the hydraulic fluid pumping. The examiner notes that “a hydraulic source” is a broad limitation, and reads on any holding area of the incompressible fluid of Dietz et al.

24. Regarding claim 46, Dietz et al. teach that the pump and electrical drive device are adapted for releasable connection to the subsea tree via threaded joints (47, see paragraph 14).

Claim Rejections - 35 USC § 103

25. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

26. Claims 1-5, 33, 35, 37, 42, and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dietz et al. in view of Giese (US 1,852,562).

27. Regarding claim 1, Dietz et al. teach a pump device for the hydraulic actuation of a valve (see Fig. 5) used in the production of hydrocarbons (such as crude oil or natural gas). In particular, Dietz et al. teach a safety valve (60, see Fig. 2), and a pump (102, see paragraph 25). Dietz et al. teach that the pump can pump hydraulic fluid in the direction of the valve (to actuate the mechanical linkage 95), and that the pump may be an electric pump (thus comprising an electric drive device). Dietz et al. do not teach the details of the pump (102), and thus do not teach a piston-cylinder unit. Giese et al. teach a high-torque pump (shown generally in Fig. 1) having an electrical drive device (50, and attached elements) movably connected to a piston (27) for alternating movement thereof in a longitudinal direction inside a cylinder (12). It would have been obvious to one of ordinary skill in the art at the time of the invention to use a pump as taught by Giese in the valve system taught by Dietz et al., in order to provide the electric pump contemplated by Dietz et al.

28. Regarding claim 2, Giese teaches that the electrical drive device includes a spindle drive (see Fig. 1), a reduction gear (49), a spur gear (44), and a drive shaft driven by an electric motor (50).
29. Regarding claim 3, Giese teaches that the spindle drive includes a rotatable but axially immovable spindle nut (47), and an axially movable threaded spindle (20, 28).
30. Regarding claim 4, Giese teaches that the threaded spindle (20, 28) is releasably connected (via bolts 29, see pg. 1, ln. 8—83) at its actuating end to the piston (27).
31. Regarding claim 5, Giese teaches that the spindle nut (47) is movably connected to the reduction gear (49).
32. Regarding claim 33, Giese teaches that the pump device is of a modular construction (see Fig. 1).
33. Regarding claim 35, Dietz et al. teach a quick-release coupling (47) between a housing of the pump and a hydraulic fluid supply pipe (39).
34. Regarding claim 37, Dietz et al. teach that the hydraulic fluid is an injection fluid, in that it is injected into the hydraulic valve system by the pump.
35. Regarding claim 42, Dietz et al. teach that the injection fluid is an inhibitor, at least in that it is used to inhibit the closing of the safety valve.
36. Regarding claim 43, Dietz et al. teach a pump device (102) for the hydraulic actuation of a safety valve (60) on a pipeline used in the production of hydrocarbons. Giese teaches that the pump device may comprise a body (10) with a cylinder (12) housing a piston (27) such that hydraulic fluid can be pumped under pressure in the direction of the safety valve of Dietz et al. Giese further teaches an electrical drive

device (50) movably connected to the piston to move it in a longitudinal direction inside the cylinder. One of ordinary skill would expect that this motion both could and would occur upon the hydrocarbons reaching a predetermined pressure.

37. Claims 6 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dietz et al. in view of Giese as applied to their respective parent claims above, and further in view of Flinchbaugh et al. (US 4,398,110).

38. Regarding claim 6, neither Dietz et al. nor Giese teach a harmonic drive gear. As a result, neither teaches a flexible cup-shaped toothed sleeve. Flinchbaugh et al. teach an electric actuator including a harmonic gear, and indicate generally that harmonic gears provide a high torque to weight ratio (col. 1, ln. 51-55). Speaking generally, harmonic drive gears are well known in the art, and are known to provide an excellent gear ratio in a compact (and thus light as indicated by Flinchbaugh et al.) package. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the gear train of the pump of Giese to include a harmonic drive gear as taught by Flinchbaugh et al., in order to take advantage of the harmonic drive gear's characteristic compactness and lightness. As taught by Flinchbaugh et al., such a harmonic drive gear would include a flexible, cup-shaped toothed sleeve (32) which would be rotationally rigidly connected to the spindle nut (47) of Giese.

39. Regarding claim 39, in a combination of Dietz et al, Giese, and Flinchbaugh et al., the reduction gear is a harmonic drive gear as taught particularly by Flinchbaugh et al.

40. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dietz et al. in view of Giese and Flinchbaugh et al. as applied to claim 6 above, and further in view of Campbell et al. (US 3,261,591).

41. Regarding both claims 8 and 9, in the combination, a wave generator (62) as taught by Flinchbaugh et al. would be rotationally rigidly connected to a first spur wheel (49) of Giese, and a second spur wheel (44) would be rotationally rigidly connected to the drive shaft of the motor (50) of Giese. Neither Giese nor Flinchbaugh et al. teach that the spur gear is helically toothed. However, Campbell et al. teach a gear system for a winch, and teach that "helical or double helical gear trains interposed between the prime mover and the haulage element dependent on the torque and speed of rotation," (col. 1, ln. 30-32). As a result, it is clear that one of ordinary skill would be aware of the presence of helical and double helical spur gears in the art, and that they would be suitable for an application such as transferring rotation between the drive shaft of Giese to the piston. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use a helical or double helical spur gear in the drive train of the pump of Giese as modified by Flinchbaugh et al. and used in the system of Dietz et al.

42. Claims 10-13, 15, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dietz et al. in view of Giese as applied to claim 1 above, and further in view of Yie (US 4,862,911).

43. Regarding claim 10, Giese teaches that the piston (27) is adjustably supported in a piston chamber (12). However, neither Dietz et al. nor Giese teach a piston chamber having a suction and a discharge hole. Yie teaches a check valve assembly for high pressure pumps, or pumps similar to that of Giese as used in the system of Dietz et al. In particular, Yie teaches a cylinder end assembly (10) having a suction hole (22) and a discharge hole (31). It would be obvious to one of ordinary skill in the art to use a valve assembly as taught by Yie in the pump of Giese as used in Dietz et al. in order to provide the fluid routing required by Dietz et al.
44. Regarding claim 11, Yie teaches that each hole has a non-return valve (32, 24) which is subjected to a (spring) force opposite to the hydraulic fluid flow direction through the respective hole.
45. Regarding claim 12, Yie teaches that the holes are formed in a cylinder bottom plate (14), which in the combination would be releasably fixed on the cylinder (12) of Giese.
46. Regarding claim 13, Yie teaches that the suction hole opens into an intermediate reservoir (the chamber of the valve 24) of the pump device with its end facing away from the piston.
47. Regarding claim 15, Yie teaches that the discharge hole (31) is connected to a discharge pipe (15) for the passage of the hydraulic fluid, which would pass in a direction of the valve in the present combination.

48. Regarding claim 16, Yie teaches that the discharge pipe (15) is brought out through an intermediate reservoir (chamber of the valve 32) from what would be the pump housing of Giese in the combination.

49. Claims 36 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dietz et al. in view of Giese as applied to claims 1 and 3 above respectively, and further in view of Hommel (US 6,208,923).

50. Regarding claim 36, neither Dietz et al. nor Giese teach redundant servomotors. Hommel teaches a fault-tolerant steering mechanism, including a reciprocating element (1) analogous to the piston of Giese, and two servomotors (14a, 14b) arranged to actuate the reciprocating element (1) and arranged in a redundant fashion. Hommel teaches that this provides reliable control of the reciprocation, even in the event of a fault (col. 1, ln. 40-42). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use two redundantly arranged servomotors as taught by Hommel to replace the electric motor of Giese, in order to gain reliability of control.

51. Regarding claim 38, Hommel teaches a position sensor (3) associated with the reciprocating element, which would be the threaded spindle in the present combination.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Philip Stimpert whose telephone number is (571)270-1890. The examiner can normally be reached on Mon-Fri 7:30AM-4:00PM, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Devon Kramer can be reached on (571) 272-7118. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Devon C Kramer/
Supervisory Patent Examiner, Art
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Examiner, Art Unit 3746
7 November 2008